

**UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA**

**HIGHLY CONFIDENTIAL: SUBJECT TO PROTECTIVE ORDER**

SURGICAL INSTRUMENT SERVICE  
COMPANY, INC.,

Plaintiff,

**VS.**

INTUITIVE SURGICAL, INC.,

**Defendant.**

Case No. 5:21-cv-03496.

## EXPERT REPORT

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## **I. Introduction and Summary of Conclusions**

### *A. Expert Background and Qualifications*

1. I am the President and co-founder of Monument Economics Group (“Monument”), an economic consulting firm based in Arlington, VA. Monument provides economic research and quantitative and statistical analyses to clients in the United States, Canada, and elsewhere internationally. I have studied the economics of markets and prices and have consulted on these issues for over 30 years. I have previously been asked to opine on a variety of economic issues, including the existence of monopolization or cartel behavior in various markets, damages arising from anti-competitive conduct, and class-wide impact arising from alleged price-fixing and anticompetitive conduct as well as class-wide injury arising from allegations of consumer fraud or breach of warranty. A copy of my curriculum vitae, including a list of the matters in which I have submitted expert testimony in the past four years, is attached to this report as Appendix A.

2. I graduated from the University of Tennessee, Knoxville in 1987 (*summa cum laude*, Phi Beta Kappa) as the top graduate in my class in the College of Arts and Sciences. I earned a Master’s degree in economics from the University of Maryland in 1989. I received the Doctor of Philosophy degree in economics from the University of Pennsylvania in 1994. My economic research has been published in peer-reviewed journals such as the *Journal of Econometrics*, *Journal of Development Economics*, *CATO Journal*, *Regulation*, and others. I have also served as a referee for leading economics journals, including the *International Economic Review*, *Journal of Business and Economic Statistics*, *Journal of Labor Economics*, *American Journal of Agricultural Economics*, and *Contemporary Economic Policy*.

3. Prior to co-founding Monument, I held a variety of positions in government, academia, and other consulting firms. From 1994 until 1999, I was an Economist (later Senior Economist) with the Federal Reserve System of the United States in Washington, DC and Kansas City, Missouri. From 1999 until 2004, I taught economics and agricultural economics at North Carolina State University in Raleigh, North Carolina. I have also been hired as an economic consultant to the World Bank and the Government



of Peru, in addition to being retained on a wide range of economic consulting projects in a variety of contexts. Courts in the United States and Canada have accepted my economic analyses of the market as evidence in litigation involving allegations of anticompetitive conduct in a number of cases including, for example, *In re: Domestic Drywall Antitrust Litigation*, *Fond Du Lac Bumper Exchange Inc., et al. v. Jui Li Enterprise Company Ltd. et al.*, *In re: Puerto Rican Cabotage Antitrust Litigation*, *In re: Aftermarket Auto Lighting Products Antitrust Litigation*, *In re: Titanium Dioxide Antitrust Litigation*, *Eugene Allan, et al.* In addition to my consulting activities, I most recently have taught economics at the University of Tennessee, Knoxville, where I am an adjunct faculty member in the Department of Economics in the Haslam College of Business. The hourly rate for my work in this matter is \$750 per hour. Monument's compensation in this matter is not contingent upon the content of my testimony or the outcome of this litigation.

#### *B. Summary of Plaintiffs' Allegations*

4. I understand that a Complaint was filed on May 10, 2021 by Surgical Instrument Service Company, Inc. ("SIS" or "Plaintiff") against Intuitive Surgical, Inc. ("Intuitive" or "Defendant").<sup>1</sup> I understand from Counsel for the Plaintiff that Plaintiff's allegations in this matter relate to Intuitive's dominance of the market for minimally invasive soft tissue surgical robots ("MIST Surgical Robots") with its da Vinci surgical robots, and that, through exclusionary and anticompetitive conduct, Intuitive uses this dominance to maintain its monopoly in a separate market: the market for replacements and repairs of EndoWrists, which are surgical instruments (e.g., graspers, forceps, scissors, etc.) that are used during the da Vinci robotic surgeries ("EndoWrist Repair and Replacement Market"). I further understand Plaintiff alleges that "Intuitive has gone to extraordinary efforts to leverage its monopoly power in robots for use in minimally invasive soft tissue surgery, the repair and support of those robotic systems, and its monopoly power in instruments for use with such robots to foreclose aftermarket repair of those instruments by any competitors. This costs hospitals and patients at least 30-45% per instrument

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<sup>1</sup> United States District Court Northern District of California, *Surgical Instrument Service Company, Inc., Plaintiff, v. Intuitive Surgical, Inc., Defendant*, Case No.: 5:21-cv-03496, Complaint, May 10, 2021 (hereafter "Complaint").

(which savings would increase over time) or hundreds of millions of dollars a year in a \$2.4 billion market, without any safety or technical justification.”<sup>2</sup> I further understand Plaintiff alleges that an “effect of Intuitive’s anticompetitive conduct is to generate and sustain unreasonably high, supra-competitive prices for aftermarket EndoWrist instruments” (the “Alleged Misconduct”).<sup>3</sup>

5. In particular, I understand Defendant’s alleged anticompetitive conduct to “foreclose aftermarket repair of those [EndoWrist] instruments by any competitors” includes the following:

- Intuitive’s standard sales and service agreement for its da Vinci surgical robots “demands that customers further agree to a limited license for the use of EndoWrist instruments,” which “expires once an EndoWrist instrument is used up to its maximum number of uses as specified in the documentation accompanying the particular instrument,”<sup>4</sup> and “prohibits customers from engaging any unauthorized third party to repair, refurbish, or recondition EndoWrist instruments, whether before or after the limited use license has expired.”<sup>5</sup>
- “Between late 2019 to early 2020, Intuitive sent letters to and had in-person conversations with SIS’s customers or potential customers, knowing that they were under contract or in contractual negotiations for repaired EndoWrists. As a result of the threats and misleading statements in those letters and conversations,

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<sup>2</sup> Complaint at ¶28. I further understand Plaintiff alleges that “[w]hen Intuitive discovered that its customers were using SIS’s services, it immediately leveraged its anti-competitive agreements and monopoly power to crush this threat to its supra-competitive EndoWrist profitability.” See Complaint at ¶6.

<sup>3</sup> Complaint at ¶24. “Intuitive leverages its market power in the worldwide and domestic markets for the sale of surgical robots used in minimally invasive soft tissue surgery, and the market for repair services for their robots, to pressure its customers to use supra-competitively priced replacement EndoWrist parts.” See Complaint at ¶65.

<sup>4</sup> Complaint at ¶4. I understand Plaintiff alleges that “EndoWrists also include an internal memory chip” which “counts the number of times the EndoWrist is attached to a da Vinci robot arm, not an actual measure of usage such as usage time, number of movements, or actuation time.” See Complaint at ¶¶30-31. Further, I understand that Plaintiff alleges that the “da Vinci robot system queries the memory chip prior to performing any operations with the particular EndoWrist instrument. After a certain number of uses, usually limited to ten, the EndoWrist instrument is rendered non-operational, based solely on the number of times it is attached to a da Vinci robot arm, without any regard to the actual underlying physical condition of the EndoWrist instrument. Without the services of providers such as SIS, the hospital has no choice but to buy a brand-new replacement EndoWrist instrument from Intuitive at full price.” See Complaint at ¶32.

<sup>5</sup> Complaint at ¶4.

replaced with a new instrument.<sup>66</sup> The standard number of uses for EndoWrist surgical instruments is ten, however, in October 2020, Intuitive launched an “Extended Use Program” which allows for twelve to 18 uses for select da Vinci Xi and da Vinci X surgical robots.<sup>67</sup> The fourth generation of da Vinci surgical robots (“da Vinci Xi” and “da Vinci X”) utilize different EndoWrist surgical instruments that are not compatible with earlier generations of da Vinci surgical robots.<sup>68</sup>

24. The number of da Vinci surgical robots installed in hospitals in the U.S. has grown steadily over the last two decades. In 2005, there were nearly 300 da Vinci surgical robots installed in U.S. hospitals.<sup>69</sup> By 2010, Intuitive’s installed base had grown to 1,285,<sup>70</sup> and by the end of 2021 it had reached more than 4,100.<sup>71</sup> Figure 4 below illustrates the growth of the da Vinci surgical robot’s installed base in the U.S. from 2009 to 2021.

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<sup>66</sup> Longmore et al. at p. 16.

<sup>67</sup> Longmore et al. at p. 16; Intuitive 2021 SEC Form 10-K at p. 8.

<sup>68</sup> Intuitive 2022 SEC Form 10-Q at p. 27.

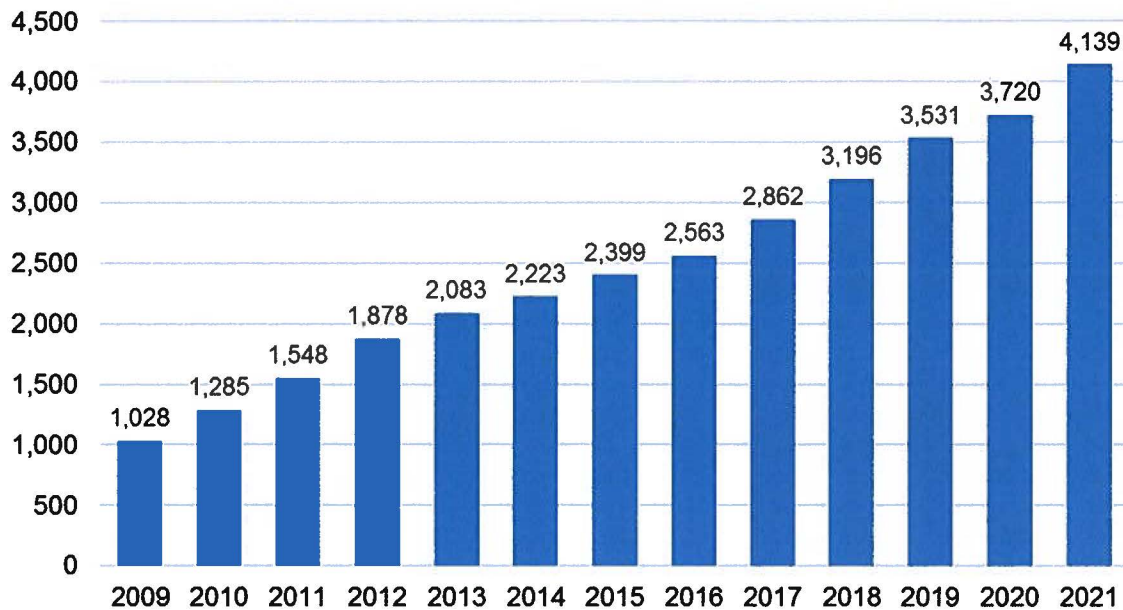
<sup>69</sup> Intuitive reported an installed base of 296 da Vinci surgical robots in North America in 2005. See Intuitive Surgical, Inc., SEC Form 10-K, filed March 15, 2006 at p. 33.

<sup>70</sup> Intuitive Surgical, Inc., SEC Form 10-K, filed February 1, 2011 at p. 43.

<sup>71</sup> Intuitive 2021 SEC Form 10-K at p. 12.



**Figure 4**  
**Installed Base of da Vinci Surgical Robots in the United States**  
**2009 - 2021**



Source: Intuitive SEC Form 10-Ks, 2009 - 2021.

25. Along with the steady growth in the installed base of da Vinci surgical robots, Intuitive's Instruments and Accessories business segment (which primarily includes its sales of EndoWrist surgical instruments) has also achieved significant growth in recent years. For example, as shown in Table 2 below, from 2017 to 2021, Intuitive's revenues from its Instruments and Accessories business segment in the U.S. increased 76.2 percent. Instruments and Accessories' growth in sales outpaced Intuitive's other business segments, Systems (which primarily consists of sales of da Vinci surgical robots) and Service, whose sales increased 69.8 percent and 43.9 percent, respectively, during this time. The Instruments and Accessories business segment accounts for a significant portion of Intuitive's overall U.S. revenues; in 2021, Instruments and Accessories sales accounted for 57.7 percent of Intuitive's overall revenues in the U.S.

tying arrangements is that they enable a firm having a monopoly in one market to obtain a monopoly in a second one.”<sup>186</sup> This is typically referred to as the “leverage” theory.<sup>187</sup> Tying arrangements can be used by a monopolist in the tying market to foreclose rivals in the tied product market if a “substantial share of the tied product market is foreclosed.”<sup>188</sup>

82. It is my opinion, based on evidence I have reviewed, that Intuitive possessed monopoly power in the market for MIST Surgical Robots during the Relevant Period, which provided Intuitive necessary leverage to foreclose competition and maintain its monopoly in the EndoWrist Repair and Replacement Market. I discuss the evidence that forms the bases for this opinion in more detail below.

i. Intuitive Dominated the Market for MIST Surgical Robots in the United States During the Relevant Period

83. According to the DOJ, “courts typically have required a dominant market share before inferring the existence of monopoly power.”<sup>189</sup> Evidence I have reviewed demonstrates that Intuitive dominated the market for MIST Surgical Robots during the Relevant Period. For example, a September 2019 Bernstein Research analyst report covering Intuitive and potential competition noted that “Intuitive has held a monopoly position [in the market for surgical robots] for the last two decades.”<sup>190</sup> A September

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<sup>186</sup> Richard A. Posner, *Antitrust Law*. Second Edition, Chicago, IL: The University of Chicago Press, 2001 (hereafter “Posner”) at p. 197.

<sup>187</sup> Posner at p. 198.

<sup>188</sup> Economides at p. 130.

<sup>189</sup> DOJ Single-Firm Conduct at p. 21. According to the DOJ: “The Fifth Circuit observed that ‘monopolization is rarely found when the defendant’s share of the relevant market is below 70%.’ Similarly, the Tenth Circuit noted that to establish ‘monopoly power, lower courts generally require a minimum market share of between 70% and 80%.’ Likewise, the Third Circuit stated that ‘a share significantly larger than 55% has been required to establish prima facie market power’ and held that a market share between seventy-five percent and eighty percent of sales is ‘more than adequate to establish a prima facie case of power.’” See DOJ Single-Firm Conduct at p. 21. The DOJ also noted that the “Eleventh Circuit held that a ‘market share at or less than 50% is inadequate as a matter of law to constitute monopoly power.’” See DOJ Single-Firm Conduct at pp. 21-22.

<sup>190</sup> DeSantis Deposition Exhibit 8 at Intuitive-00278221. Similarly, a March 2020 article regarding the robotic surgery market noted: “Intuitive Surgical, manufacturer of the da Vinci Surgical System, has been the uncontested market leader in robotic general surgery for the last two decades. [...] Although Intuitive Surgical has long been the only company with a surgical robot cleared for general surgery, the situation could be about to change.” See Dr. Ivan De Backer, “Dissecting the Robotic Surgery Market,” IDTechEx, March 30, 2020. Available at: <https://www.idtechex.com/en/research-article/dissecting-the-robotic-surgery-market/20232>. Also, a September 2018 article published in *Annals of the Royal College of Surgeons of England* noted that “[f]or 20 years Intuitive Surgical’s da Vinci system has held a monopoly in minimally invasive robotic surgery.” Andrew Brodie and Nikhil Vasdev, “The future of robotic surgery:

2017 study in the *Journal of Minimal Access Surgery* noted that Intuitive's da Vinci surgical robot was the "the only commercially available robotic equipment" at the time.<sup>191</sup> Similarly, a May 2019 study on the "*Annals of Laparoscopic and Endoscopic Surgery*" noted that Intuitive "[e]ffectively [possessed] a monopoly" in the robotic surgery industry.<sup>192</sup> An April 2018 article regarding robotic surgery published in the *World Journal of Urology* stated: "For the last 20 years, the predominant robot used in laparoscopic surgery has been [d]a Vinci by Intuitive Surgical. This monopoly situation has led to rising costs and relatively slow innovation."<sup>193</sup> Under a section titled "Competition A Modest Threat," an April 2019 Bloomberg Intelligence analyst report covering Intuitive stated:

Intuitive Surgical is unlikely to face significant competition in robotics until 2020, when Johnson & Johnson and Medtronic are expected to enter the market. Intuitive has a substantial lead being on its fourth-generation platform and having over 5,000 systems installed, and remains specialized while peers will be conglomerates.<sup>194</sup>

A March 2019 article published in Barrons stated that "[Intuitive] is the only major manufacturer of robotic-surgery equipment, with a monopoly on the market for now."<sup>195</sup> An October 2019 Financiële Diensten Amsterdam bv analyst report noted: "Competition for Intuitive Surgical is still insignificant. While large players, among which Johnson & Johnson and Medtronic, are planning competing systems, Intuitive has a strong competitive position, supported by various elements that are both difficult and time-consuming to replicate or substitute, also for large cash-rich players."<sup>196</sup> As of late

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How robotics could help shape the future of surgical care," *Annals of the Royal College of Surgeons of England*, September 4, 2018.

<sup>191</sup> Ioannis D. Gkegkes, Ioannis A. Mamais, and Christos Iavazzo, "Robotics in general surgery: A systematic cost assessment," *Journal of Minimal Access Surgery*, Vol. 13, No. 4, 2017, 243-255 at p. 243.

<sup>192</sup> Rafael E. Perez and Steven D. Schwaitzberg, "Robotic surgery: finding a value in 2019 and beyond," *Annals of Laparoscopic and Endoscopic Surgery*, Vol. 4., May 30, 2019 (hereafter "Perez et al.").

<sup>193</sup> Pradeep P. Rao, "Robotic surgery: new robots and finally some real competition!," *World Journal of Urology*, Vol. 36, No. 4, April 2018 (hereafter "Rao") 537-541 at p. 537.

<sup>194</sup> Jason McGorman, "Intuitive Surgical Research," Bloomberg Intelligence, April 2019.

<sup>195</sup> Daren Fonda, "Intuitive Surgical Faces New Competition and FDA Concerns," Barrons, March 18, 2019. Available at: <https://www.barrons.com/articles/intuitive-surgical-faces-new-competition-and-fda-concerns-51552903200>.

<sup>196</sup> Marcel Oomen, "Record High Growth in Surgical Procedures Triggers Upgrade of Guidance," Financiële Diensten Amsterdam, October 18, 2019, 1-4 at p. 1.



February 2022, Johnson & Johnson and Medtronic had yet to achieve FDA approval to market competing systems in the U.S.<sup>197</sup>

84. In addition, I have reviewed evidence of Intuitive's own acknowledgments of its monopoly in the market for MIST Surgical Robots. For example, Bob DeSantis of Intuitive testified that, between 1999 and 2019, there were not "any viable alternatives to a surgeon that wanted to perform a minimally invasive soft tissue robotic surgery other than the da Vinci surgical robot."<sup>198</sup> In a February 2018 email to colleagues regarding strategies for how to address competition with hospital representatives, Joseph Fridlin of Intuitive stated: "Right now many [hospitals] are very happy to have competition because they hate that we are a monopoly."<sup>199</sup> In a June 2018 email to colleagues, Phil Bradshaw, Intuitive's General Manager in the UK, stated: "What I think we should do behind the scenes is develop a competition talk track around all the areas they mention, and train our people – most of which have not come across any competition in their time at [Intuitive]."<sup>200</sup> In a February 2018 email to colleagues, Ralph Wadensweiler of Intuitive shared a presentation regarding "Robotic Surgical Systems in Urology," and noted the finding that "[s]urgeons don't like the [Intuitive] monopoly."<sup>201</sup>

85. As I previously discussed, at his May 2021 deposition, Glenn Vavoso of Intuitive testified that the only surgical robots that have FDA clearance to perform minimally

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<sup>197</sup> Elizabeth Cairns, "Intuitive faces down the competition," *Evaluate Vantage*, February 22, 2022 (hereafter "Cairns"). Available at: <https://www.evaluate.com/vantage/articles/interviews/intuitive-faces-down-competition>. At the time, it was expected that Johnson & Johnson would not achieve FDA approval in the U.S. until 2026, while a competing system from Medtronic was expected to achieve FDA approval in 2022. See Cairns. However, as of October 2022, Medtronic's Hugo surgical robot was still being studied in the U.S. and was not available for sale in the U.S. See Conor Hale, "Medtronic's Hugo surgical robot collects green lights in Europe, Canada, Japan," *Fierce Biotech*, October 19, 2022. Available at: <https://www.fiercebiotech.com/medtech/medtronics-hugo-surgical-robot-collects-green-lights-europe-canada-japan>.

<sup>198</sup> DeSantis Deposition at 69:19-24.

<sup>199</sup> Intuitive-00113020. Mr. Fridlin further noted these hospitals "will use this [competition] to beat us up on price. Competition will also come in low balling pricing so they can just get a foothold." See Intuitive-00113020.

<sup>200</sup> Vavoso Deposition Exhibit 13 at Intuitive-00100409.

<sup>201</sup> Intuitive-00029346-47; Riccardo Autorino, MD, PhD, FEBU, "Robotic Surgical Systems in Urology: What's in the Pipeline?," Grand Rounds in Urology, February 7, 2018 (hereafter "GRU Presentation"). Available at: <https://grandroundsinurology.com/robotic-surgical-systems-in-urology/>. Regarding the "'Monopoly' Issue," Dr. Autorino states: "Certainly, one big issue with robotic surgery is that we have only one company. So, it's a monopoly that is in charge to control the market, and they--the robotic system installed in the world from Intuitive has been exponentially grown over the years." See GRU Presentation.



invasive soft tissue surgeries in the U.S. are TransEnterix, Inc.'s ("TransEnterix")<sup>202</sup> Senhance surgical robot and Medrobotics Corporation's ("Medrobotics") Flex surgical robot.<sup>203</sup> However, evidence demonstrates that these two surgical robots have gained at best a *de minimis* share of the market for MIST Surgical Robots. For example, Glen Vavoso estimated that in 2019 in the U.S., Intuitive's da Vinci surgical robot had an installed base between 3,000 and 3,500; TransEnterix's Senhance had an installed base of 15 or less; and Medrobotics' Flex had an installed base of 10 or less.<sup>204</sup> Mr. Vavoso further testified that in 2020 in the U.S., Intuitive's da Vinci had an installed base between 3,500 and 4,000; TransEnterix's Senhance had an installed base of 15 or less; and Medrobotics' Flex had an installed base between seven and ten.<sup>205</sup> From 2019 to 2020, the da Vinci surgical robot continued to grow and competitors were unable to expand their share of the market, as the installed base of TransEnterix's Senhance and Medrobotics' Flex stayed largely the same, while the Intuitive's da Vinci installed base grew by approximately 500 surgical robots.<sup>206</sup> Consistent with Mr. Vavoso's testimony, U.S. market share in the market for MIST Surgical Robots in 2020 is shown in Table 3 below. As shown, in 2020, Intuitive accounted for over 99 percent of the total installed base of MIST Surgical Robots in the U.S.

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<sup>202</sup> I understand that in February 2021 TransEnterix, Inc. changed its name to Asensus Surgical, Inc. ("Asensus"). See "TransEnterix Announces Name Change to Asensus Surgical and Introduces a New Category of Surgery, Performance-Guided Surgery," Business Wire, February 23, 2021. Available at: <https://www.businesswire.com/news/home/20210223005444/en/TransEnterix-Announces-Name-Change-to-Asensus-Surgical-and-Introduces-a-New-Category-of-Surgery-Performance-Guided-Surgery>. Unless otherwise noted, throughout the remainder of this Expert Report I use the names TransEnterix and Asensus interchangeably.

<sup>203</sup> Vavoso Deposition at 85:20-98:6. I have noted that an Intuitive September 2018 "Competitive Landscape" analysis notes that Medrobotics' Flex surgical robot has FDA clearance in the U.S. for "[v]isualization only." See Intuitive-00173706. Similarly, in a 2017 "competitive overview" analysis, Intuitive notes that the Flex surgical robot is for "[r]obotic access, not surgery." See Intuitive-00234762-4838 at 4816.

<sup>204</sup> Vavoso Deposition at 117:14-118:1.

<sup>205</sup> Vavoso Deposition at 118:2-119:2, Exhibit 14.

<sup>206</sup> Vavoso Deposition at 120:3-121:10.

**Table 3**  
**2020 U.S. MIST Surgical Robot Market Share**

Manufacturer/Robot	Installed Base	Market Share
Intuitive da Vinci	3,720	99.5%
TransEnterix Senhance	7	0.2%
Medrobotics Flex	13	0.3%
<b>Total</b>	<b>3,740</b>	<b>100.0%</b>

Source: 2020 Intuitive SEC Form 10-K at p. 10; TransEnterix Inc., SEC Form 10-K, filed on March 18, 2018 at p. 31; TransEnterix Inc., SEC Form 10-K, filed on February 27, 2019 at p. 33; Asensus Surgical, Inc., SEC Form 10-K, filed on March 11, 2021 at p. 4; Intuitive-00571075.

86. The evidence discussed above demonstrates that Intuitive dominated the market for MIST Surgical Robots during the Relevant Period. This constitutes one piece of evidence demonstrating that Intuitive possessed monopoly power in the tying market (the market for MIST Surgical Robots) during the Relevant Period.

ii. There Were Significant Barriers to Entry Into the Market for MIST Surgical Robots in the United States During the Relevant Period

87. As I previously discussed, another important requirement in determining whether a firm possessed monopoly power is whether there existed barriers to market entry that would allow the firm to exercise substantial market power for an appreciable period. According to the DOJ, these barriers to entry could include “ones [that were] created by the firm’s conduct itself.”<sup>207</sup> The DOJ also noted that “circuit courts have found that firms with dominant market shares lacked monopoly power when their market power was insufficiently durable.”<sup>208</sup> Evidence I have reviewed demonstrates that there were significant barriers to entry into the market for MIST Surgical Robots during the Relevant Period. I discuss this evidence in more detail below.

88. For example, in a December 2020 Intuitive investment analysis, Enlightened Capital noted “the robotic surgery market is characterized by high customer switching

<sup>207</sup> DOJ Single-Firm Conduct at p. 21.

<sup>208</sup> DOJ Single-Firm Conduct at p. 24.